

been comprised within the limits of this first single volume. Not content, however, with the space the observers have contrived to fill with the amplification of their notes and discussions of the physiography of the regions which they rapidly traversed, and of which they can have acquired only the most superficial knowledge, Mr. Bailey Willis is yet to inflict upon us another volume of his "detailed presentation of results," besides the other reports that are promised.

If it is asked what have been the chief fruits of this skilfully-planned foray into the Chinese empire, two conspicuous features may be pointed to, on which the explorers deserve to be congratulated. They have materially increased our knowledge of the earliest Palæozoic fauna of China, and they have brought to light a remarkable band of boulder-clay, full of striated stones, lying apparently at the base of the Cambrian system.

The large increase which has thus been made to the known Cambrian fossils of China has been provisionally discussed by Mr. Walcott in a paper published in 1905, in the Proceedings of the United States National Museum, and will be more fully treated in the third volume of the Reports of the Expedition. It appears that at least forty-eight genera and 172 species of organisms are now known to occur in Chinese Cambrian formations, the greater number being assigned by Mr. Walcott to the middle division of the system. The lower division has yielded comparatively few forms, and it does not appear that any trace has been recovered of a fauna older than Cambrian. The trilobitic representation is especially abundant, comprising 118 species, belonging to twenty-five genera. The full details respecting this primæval fauna will be awaited with much interest.

It would appear from the observations of Messrs. Bailey Willis, and Blackwelder that Richthofen perhaps over-estimated the thickness of his "Sinisches System," and that the chances of the recovery of a pre-Cambrian fauna were less than had been hoped for. In Shan-tung the total thickness seems to be little more than 4000 feet, of which only some 1500 or 1600 feet are relegated to the Cambrian system, the overlying strata being referred to the next member of the Geological Record. The lower Cambrian division, consisting of 500 or 600 feet of shales and thin limestones, rests unconformably on a set of gneisses, schists, and granite, with other eruptive rocks. Mr. Blackwelder made a reconnaissance, in the Liau-tung peninsula, nearly along Richthofen's route; but he was unable to add anything of importance to what was noted by the German explorer regarding the Cambrian rocks of that district.

In threading the gorges of the Yang-tzi, the expedition at Nan-t'ou found at the base of the Palæozoic series a remarkable group of sediments resting unconformably on granite-gneiss, and having a total thickness of about 370 feet. Above a conglomerate and a series of red and white sandstones lies a mass of hard green boulder-clay or till, some 200 feet thick, which can be seen to dip under the Ki-sin-ling limestone. No fossils were obtained by the travellers from this boulder-clay, nor after a search for two hours

were any found by them in the overlying bands of limestone. But as they disinterred Lower and Middle Cambrian organisms from what they regarded as the same limestone within less than 100 miles from Nan-t'ou, they regard it as highly probable that this ancient boulder-clay is of early Cambrian age.

The stones are subangular, with rounded edges and well-polished and well-striated surfaces. They are of various kinds of rock, and of all sizes up to two feet and a half in length, and they are huddled together without order, as in ordinary boulder-clay. The specimens represented in plate xxxviii. might have been selected as typical examples from any Pleistocene boulder-clay of Europe or America. It is hardly possible to resist the evidence that here is a true glacial deposit which, whether or not intercalated at the very base of the Cambrian system of China, must almost certainly be of early Palæozoic date.

The physiographical discussions in the volume are most unsatisfactory. When one reflects how difficult are the problems of physiographical development, how much patient research is needed into the geological history of a region, how much detailed local topographical knowledge is absolutely essential, and how little, after all, dogmatism on the subject is permissible, one is amazed at the confidence with which the physiography of vast territories is here disposed of. It is not by surveys of fifty square miles a day that these problems are to be solved, and it is matter for regret that such jejune attempts should be made, and should find a place in what ought to be a serious contribution to science.

THE EXPLORATION OF TIBET.

Tibet, the Mysterious. By Sir Thomas Holdich, K.C.M.G., K.C.I.E. Pp. ix + 356; illustrated. (London: Alston Rivers, Ltd. 1906.) Price 7s. 6d. net.

"THE public which concerns itself about Tibet is a very small one; indeed," says Sir Thomas Holdich in the volume he has compiled for "The Story of Exploration" series, and to this we may add that public interest in that country is not likely to be increased by such unsympathetic treatment as the subject receives in this book. The story of geographical achievement in Tibet, and especially of the attempts to reach the jealously guarded capital of the then closed land, was for many years one of the most fascinating interest, and now in the light of the more precise information that has recently been made available it could well afford re-telling as an instructive record of great daring and tenacity of purpose. In professing to supply such a summary, however, the present account is disappointing in that its information is neither very trustworthy nor up-to-date. The author does not appear to have any personal knowledge of the country, nor has he made himself sufficiently acquainted with what has been written on the subject, with the result that his book betrays frequent inaccuracies, and a lack of clear perspective that is rather bewildering to the reader. The narrative is made up for the most part of quotations from the reports of the more or less illiterate native sur-

veyors, whose accounts, we are here told, although "the best and most important of all the stirring records of that remarkable country, have never yet seen the light"; whereas, as is well known, all those reports which were possessed of sufficient interest, including the best of them, namely, that by A-K, were published many years ago.

The geographical theme is frequently lost sight of altogether under the heaps of irrelevant topics that are dragged in. Indeed, fully one-fifth of the whole book is made up of generous extracts from the pages of Huc, the Lazarist missionary (not "Jesuit"), notwithstanding that our author admits "we do not gain much in the way of geographical information from it"! Relying on such antiquated sources of information, without being careful to check the stories by comparison with the more precise facts of later scientific research, Sir Thomas repeats many of the erroneous statements of the native surveyors as well as the mistaken notions of the older European writers. Thus, to take some instances at random, one would imagine that the author had never heard of the trustworthy work achieved by the British Survey officers of the Lhasa Mission, so generally is it neglected in preference to the less accurate data of the pioneer native surveyors. In this way we have here repeated the gross mistakes of U. G. and Sarat Das in respect to the route from Gyantse onwards to Lhasa. Amongst others, the Yamdok Lake is stated (p. 114) to be 13,900 feet above the sea-level, and at p. 252 to be 13,800 feet instead of the 14,350 feet as given by Major Ryder, while the adjoining Dumo Lake is made to be 500 feet higher than the Yamdok, whereas it is only some three feet higher. Even the elevation of Lhasa is given at 11,600 feet instead of 11,830 feet. So, too, with the map of Lhasa; we are told that A-K's old sketch-map is still "the best map we possess of it"—this is very hard on Major Ryder, who spent several days in the streets of Lhasa surveying and measuring, and plotting out the city in a large detailed map which was published more than two years ago.

The province of Nari, which stands in the extreme north-western corner of Tibet, is strangely enough stated to be in the "southern zone" of that country. Darchendo, the great mart for Chinese tea on the eastern border of Tibet, is, he says, "more correctly called 'Ta-chien-lu' in the newer" maps—the fact, however, is rather the other way, as the latter is merely a Chinese corruption of the former, which is the original and current Tibetan name of this important place. In alluding to the Chinese invasion of Nepal, our author goes beyond his authority when he credits Sir Clements Markham with the statement that the Chinese general "Sand Fo" (properly Sund Fô) sacked Kathmandu (which he spells Khatmandu); for Markham does not say that the victorious Chinese even entered the Nepalese capital, from which the battle was fought a day's march distant. So, too, we are informed that Moorcroft (who was really a veterinary surgeon temporarily employed by the East India Company on mule-breeding questions) was "a civilian of the Indian Civil Service."

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Elementary facts even as to the position of Lamaism have not been grasped. We read (p. 51) that "Lhasa is the holy of holies, the ark of the covenant to over one-third of the human race." This amusing statement perhaps Sir Thomas did not mean to be taken seriously. For, as pointed out years ago, the Lhasa hierarchy has never been acknowledged by Buddhists outside Tibet, beyond Mongolia and a few of the sparsely populated Himalayan districts. The Buddhists of China, Japan and Corea, Siam, Burma and Ceylon would be astonished were they told that Lhasa, of which few of them have ever heard, was their "holy of holies." That place is sacred only to some five or six million votaries, and not the "400 millions" as here asserted. There are no distinctive page headings, and misspelling is frequent.

It would be pleasant to be able to congratulate the author on the illustrations, but nearly all of these we have seen elsewhere before. They are not very closely connected with the letterpress, nor are the landscape very characteristic, whilst some of them are not what they profess to be; for out of the ten, at least two are from the Sikkim side of the Himalayas, and not in Tibet at all.

L. A. W.

OUR BOOK SHELF.

An Outline of the Natural History of our Shores. By J. Sinel. Pp. xvi+347; illustrated. (London: Swan Sonnenschein and Co., Ltd., 1906.) Price 7s. 6d.

THIS book has been written "to help to open some of the volumes of this part of Nature's library" by one who, having spent nearly forty years by the sea-shore, has had excellent opportunities of gaining the necessary knowledge at first hand.

Chapters i.-xiii. are devoted to descriptions, more or less short, of the animals which are to be found between tidemarks and in the maritime zone of Jersey, their habits and where to look for them; some account is also given of the chief characters of the various groups, together with descriptions of the anatomy of a few species, and something about the development of others. The author then deals with the various reasons for colour in marine animals, of which he gives instances, together with examples of "mimetic artifices" among the crabs (others are given in the chapter on Crustacea). In the following chapters we are given lists of apparatus, &c., necessary for shore collecting and tow-netting, with the method of use. A number of useful hints are also given on anæsthetising, preserving, and mounting specimens for the museum and other purposes, and also for imbedding, cutting, and staining sections for the microscope. In the last chapter, dealing with the marine aquarium, the beginner is initiated into the, to most inland people at least, difficult art of keeping and feeding the various marine animals which flourish in captivity, and also of hatching and rearing marine larvæ.

Although on the whole good, the book is marred by several inaccurate statements; among others we may mention the following:—Echinoderms have a heart; *Loligo media* is the young of *L. forbesii*; *Galeomma* is the only bivalve which crawls, whilst the author's explanation of the way in which starfish open oysters is certainly not the correct one. Moreover, we cannot agree that the author has followed the nomenclature most generally in use, especially in Pisces and Echinoderms.

In the outfit of the shore collector, the absence of a crowbar is rather surprising, especially on a rocky